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ICC-ES Evaluation Report

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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07210—Building Insulation
Section: 07220—Roof and Deck Insulation

REPORT HOLDER:

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EVALUATION SUBJECT

STYRO-STOP ROOF INSULATION STYRO-FLEX BUILDING INSULATION; STYRO-FLEX EIFS INSULATION

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*®(IRC)
- 2006 *International Energy Conservation Code*® (IECC)
- 1997 *Uniform Building Code*™ (UBC)

Properties evaluated:

- Surface-burning Characteristic
- Thermal Resistance
- Physical Properties
- Elimination of the thermal barrier when applied directly to steel roof decks

2.0 USES

Styro-Stop expanded polystyrene (EPS) insulation boards are used as nonstructural thermal insulation in buildings of any construction type, and as components of Class A, B, and C roof covering systems installed on steel decks, when installed in accordance with this report. Styro-Stop Roof Insulation may be used as roof insulation when recognized in a current ICC-ES evaluation report on the roof covering system.

Styro-Flex Building Insulation is for use in wall cavities and ceiling assemblies or on the outside faces of exterior walls. The insulation may also be used as exterior perimeter insulation around concrete slab edges, on foundation walls, or under flat concrete slab on grade construction, except in areas where the probability of termite activity is "very heavy" as noted in Section 5.4.

Styro-Flex EIFS is an EPS foam plastic insulation board used as nonstructural thermal insulation as a component in exterior insulation and finish systems (EIFS). The insulation may be used on the outside faces of exterior walls when an ASTM C 578 Type I EPS board is recognized in a current ICC-ES evaluation report for an EIFS.

3.0 DESCRIPTION

3.1 General:

The foam plastic insulation boards have a flame-spread index of 25 or less and a smoke-developed index of 450 or less, in thicknesses up to 4 inches (102 mm), when tested in accordance with ASTM E 84.

Styro-Flex building insulation boards are available with various edge designs and various lengths and widths, and in thicknesses up to 4 inches (102 mm). The foam plastic boards are Type I, Type VIII, Type II and Type IX complying with ASTM C 578, and have nominal densities of 1.0, 1.25, 1.5 and 2.0 pcf (16, 20, 24 and 32 kg/m³), respectively.

Styro-Stop Roof Insulation is an expanded polystyrene (EPS) foam plastic insulation applied directly to steel decks. System 1 in Section 3.2 incorporates a coated board, installed with the coating toward the steel deck. System 2 in Section 3.3 incorporates typical (uncoated) EPS insulation boards.

3.2 Roof Insulation System 1:

3.2.1 General: Styro-Stop roof insulation is an EPS foam plastic insulation board used as a component in a Class A, B, or C roof covering assembly installed on steel decks in accordance with this report. The insulation board is provided with a proprietary coating on one side when installed as the first layer, and in an uncoated form for subsequent layers.

3.2.2 Materials:

3.2.2.1 Steel Deck: Steel roof decking must be minimum No. 22 MSG [0.030 in. (0.8 mm)], $1^1/_2$-inch-deep (38 mm), unperforated, painted or galvanized steel decking, with flutes spaced a maximum of 6 inches (152 mm) on center. The deck must be welded or mechanically fastened to structural supports.

3.2.2.2 Foam Plastic Insulation: Styro-Stop EPS foam plastic roof insulation has nominal densities of 1, 1.25, 1.50, and 2.00 pcf (16, 20, 24, and 32 kg/m^3) and complies with ASTM C 578 as, respectively, Type I, Type VIII, Type II, and Type IX.

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Styro Stop EPS foam plastic roof insulation boards measure 2 to 4 feet (610 to 1219 mm) wide and 4 to 8 feet (1219 to 2438 mm) long, and are available up to a maximum thickness as shown in Table 1.

3.2.2.3 Insulation Board Coating: The coated EPS boards have the coating on one side only. The EPS molder coats the boards with a proprietary mixture whose components and rate of application are in accordance with the approved quality control manual.

3.2.2.4 Roof Covering: The roof covering must be a Class A, B, or C single-ply membrane roof covering that is recognized in a current ICC-ES evaluation report. The evaluation report for the roof covering assembly must specify a generic polystyrene insulation board, having the same density and thickness as the Styro-Stop roof insulation recognized in this report, as a component of the classified roof covering assembly.

3.2.3 Installation: The Styro-Stop EPS insulation boards with the protective coating on one side are loosely laid directly over the steel deck, to a maximum total thickness and density as noted in Table 1, with the first layer of the insulation boards installed with the protective coating side facing the steel deck. Succeeding layers of EPS insulation boards, without the protective coating, are placed on top of the coated insulation boards. Minimum and maximum total thicknesses of insulation in the roof covering assembly are 2 and 8 inches (51 and 203 mm), respectively. The method of attaching the roof covering and insulation boards to the steel roof deck must be in accordance with the ICC-ES evaluation report for the roof covering material.

3.2.4 Fire-extinguishing System: In jurisdictions using the UBC, buildings or portions of buildings covered with the roof covering assembly must be fully sprinklered with a wet-pipe automatic fire-extinguishing system complying with Chapter 9 of the UBC.

3.2.5 Reroofing: New roofing must not be applied over existing roof covering assemblies. In jurisdictions using the UBC, the components of the existing roofing that are to remain on the roof deck must be inspected in accordance with Section 1515 of the Appendix to the UBC. Additional EPS foam insulation may be added over the existing EPS foam insulation, provided inspection indicates the existing EPS is sound material, the density of the EPS being added is equal to the density of the existing EPS, the existing EPS meets the requirements of this report, and the total thickness of the existing EPS plus the new EPS being added conforms to Table 1. The existing roof covering and, if necessary, the cover board must be removed before new roofing materials, having characteristics specifically described in this report, can be installed.

3.3 Roof Insulation System 2:

3.3.1 General: Uncoated Styro-Stop roof insulation may be used as a component of a Class A, B, or C roof covering installed on steel decks when installation is in accordance with Section 3.3 of this report.

3.3.2 Materials:

3.3.2.1 Steel Deck: Steel roof decking must be minimum No. 22 MSG [0.030 in. (0.8 mm)], $1^1/_2$-inch-deep (38 mm), unperforated, painted or galvanized steel decking, with flutes spaced a maximum of 6 inches (152 mm) on center. The deck must be welded or mechanically fastened to structural supports.

3.3.2.2 Foam Plastic Insulation: The uncoated foam plastic roof insulation is as described in Section 3.2.2.2 of this report.

3.3.2.3 Cover Board: When used, the cover board in the roof covering assembly is: $^1/_4$-inch-thick (6 mm) Dens-Deck Board, manufactured by Georgia-Pacific Corporation; $^1/_4$-inch-thick (6 mm) Securock, manufactured by US Gypsum; or $^1/_2$-inch-thick (12.7 mm) wood-fiber board complying with ASTM C 208.

3.3.2.4 Slip Sheet: When used, the slip sheet must be one layer of FR10 or FR50 manufactured by Atlas Roofing Corporation, and may be used as an alternative to the cover board specified for the membrane roof systems as noted in Section 3.3.2.3.

3.3.2.5 Roof Covering: The roof covering membrane must be a mechanically attached, fully adhered or ballasted EPDM or thermoplastic membrane listed in a current ICC-ES evaluation report as part of a Class A, B, or C roof covering assembly. Thermoplastic membranes include polyvinyl chloride (PVC), modified PVC, chlorosulphonated polyethylene (CSPE), and thermoplastic polyolefin (TPO). The membrane is limited to a maximum nominal thickness of 0.045 inch (1.14 mm). The evaluation report on the roof covering assembly must specify one of the following assemblies as the only components of the classified roof covering assembly permitted under the conditions of this report:

a. A generic EPS insulation board having the same density and installed thickness as the uncoated Styro-Stop roof insulation listed in this report, the cover board described in Section 3.3.2.3 or the slip sheet described in Section 3.3.2.4, and the roof covering membrane described in this section (3.3.2.5), installed over a steel deck as described in Section 3.3.2.1.

b. A generic EPS insulation board having the same density and installed thickness as the uncoated Styro-Stop roof insulation listed in this report, the roof covering membrane described in this section (3.3.2.5), and stone ballast, installed on a steel deck as described in Section 3.3.2.1 of this report.

3.3.3 Installation: The uncoated Styro-Stop roof insulation boards are loosely laid directly over the steel deck in single or multiple layers, to a maximum total thickness and density as noted in Table 1. The top layer of insulation must be placed so that the labeling required in Section 7.0 is facing up. Tapered EPS foam boards may be installed, provided the maximum allowable thickness is not exceeded. The cover board described in Section 3.3.2.3 or the slip sheet described in Section 3.3.2.4, when required, is laid over the insulation. The method of attaching the roof covering, cover boards, and insulation boards to the steel roof deck must be in accordance with the ICC-ES evaluation report on the roof covering membrane, and as described in Section 3.3.2.5 of this report.

3.3.4 Fire-extinguishing System: In jurisdictions using the UBC, buildings or portions of buildings covered with the roof covering assembly must be fully sprinklered with a wet-pipe automatic fire-extinguishing system complying with Chapter 9 of the UBC.

3.3.5 Reroofing: New roofing must not be applied over existing roof covering assemblies. In jurisdictions using the UBC, the components of the existing roofing that are to remain on the roof deck must be inspected in accordance with Section 1515 of the Appendix to the UBC. Additional EPS foam insulation may be added over the existing EPS foam insulation, provided inspection indicates the existing EPS is sound material, the density of the EPS being added is equal to the density of the existing EPS, the existing

EPS meets the requirements of this report, and the total thickness of the existing EPS plus the new EPS being added conforms to Table 1. The existing roof covering and, if necessary, the cover board must be removed before new roofing materials, having characteristics specifically described in this report, can be installed.

3.4 Styro-Flex EIFS:

Styro-Flex EIFS is molded, closed-cell, EPS insulation board complying with the Type I requirements of ASTM C 578. The insulation board is manufactured at a minimum density of 0.90 pcf (14.4 kg/m^3). For thermal resistance (*R*-values), see Section 3.5.

Styro-Flex EIFS is produced in various thicknesses up to 6 inches (152 mm), and in various sizes, with square, shiplap or tongue-and-groove edge profiles.

3.5 Thermal Resistance:

The EPS boards have thermal resistance (*R*-values), when tested in accordance with ASTM C 518, as follows:

EPS TYPE	MINIMUM DENSITY (pcf)	*R*-VALUE PER INCH OF THICKNESS (°F·FT^2·h/Btu)
I	0.90	3.6
VIII	1.15	3.8
II	1.35	4.00
IX	1.80	4.20

For **SI:** 1° F·FT2·h/Btu = 0.1761 K·m^2/W, 1 pcf = 16.02 kg/m^3.

4.0 INSTALLATION

4.1 General:

The manufacturer's published installation instructions and this report must be strictly adhered to, and a copy of the instructions must be available on the jobsite at all times during installation. See Sections 3.2.3 and 3.3.3 of this report for additional installation requirements for roofing applications.

4.2 Styro-Flex EPS Insulation Boards:

The interior of the building must be separated from the foam plastic boards with an approved thermal barrier as required by IBC Section 2603.4, IRC Section R314.4 or UBC Section 2602.4. Under the IRC, a vapor retarder must be installed in wall and ceiling assemblies, in accordance with IRC Section R318.1 or N1102.5, as applicable. Protection against condensation in exterior wall assemblies must be provided in accordance with IBC Section 1403.2. The insulation board may be applied to outside faces of exterior walls to a maximum thickness of $1^1/_2$ inches (38 mm), except that an insulation board thickness greater than $1^1/_2$ inches (38 mm) may be permitted if such installation is recognized in a current ICC-ES evaluation report on a wall covering. The attachment of the finish materials over the insulation board must allow for a minimum 1-inch (25.4 mm) penetration of the fasteners into wood framing. Sheathing or a wall covering over the insulation board must be structurally adequate to resist transverse loads. All walls must be braced in accordance with IBC Sections 2308.9.3 and 2308.12.4, or IRC Section R602.10.3, or UBC Section 2320.11.3 or 2320.11.4, as applicable.

Insulation boards must not be used as a nailing base for exterior siding materials. All nailing must be made through the insulation board into the wall framing or structural sheathing, as required by the siding manufacturer's published installation instructions or the applicable code.

In addition to the installations in Sections 3.2 and 3.3, the insulation boards may be used in roof assemblies when such use is specifically recognized in a current ICC-ES evaluation report on a Class A, B or C roof assembly in accordance with IBC Section 1505.1 or IRC Section R907.1. The method of installing the insulation board must be in accordance with the current ICC-ES evaluation report on the roof covering assembly.

4.3 Styro-Flex EIFS:

The insulation must be installed as part of an EIFS system in accordance with the current ICC-ES evaluation report on the EIFS.

5.0 CONDITIONS OF USE

Styro-Stop Roof Insulation as described in this report complies with, or is an acceptable alternate to what is specified in, the codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report governs.

5.2 When used in exterior wall applications, the insulation must be covered with an approved exterior wall covering. A water-resistive barrier complying with IBC Section 1404.2, IRC Section R703.2 or UBC Section 1402.1, as applicable, must be installed as specified for the approved assembly.

5.3 Except as noted in Sections 3.2 and 3.3 of this report, the insulation boards must be separated from the interior of the building with a thermal barrier complying with IBC Section 2603.4, IRC Section R314.4 or UBC Section 2602.4, as applicable.

5.4 Use of the insulation boards in areas of "very heavy" termite infestation must be in accordance with IBC Section 2603.8 or IRC Section R320.5, as applicable.

5.5 For systems installed under Sections 3.2 and 3.3 of this report:

5.5.1 In jurisdictions using the UBC, a wet-pipe automatic fire extinguishing system complying with Chapter 9 of the UBC is installed as described in Sections 3.2.4 and 3.3.4 of this report.

5.5.2 Reroofing is applied as described in Sections 3.2.5 and 3.3.5 of this report.

5.5.3 Permanent placards bearing the following words are attached to roof hatches and where other roof access is located: "This roof covering includes foam plastic insulation applied directly to a steel deck. The existing roofing membrane, slip sheets, and cover boards must be removed before reroofing. Limits also exist for cover boards and membranes. See ICC-ES evaluation report ESR-1025 before reroofing."

5.6 The roof insulation boards are produced by Styrotech, Inc., in Brooklyn Park, Minnesota, under a quality control program with inspections by Underwriters Laboratories Inc. (AA-668).

6.0 EVIDENCE SUBMITTED

6.1 Reports of tests in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2009, and the ICC-ES

Acceptance Criteria for Foam Plastic Insulation Applied Directly to Steel Decks (AC142), dated April 1999.

6.2 Test reports in accordance with UL 1256.

7.0 IDENTIFICATION

The EPS insulation boards are identified with a printed label showing the report holder's name or the manufacturer's name (Styrotech, Inc.) and address; the product name; the evaluation report number (ESR-1025); the name of the inspection agency (Underwriters Laboratories Inc.); and the density or type and the thermal resistance (*R*-values). The coated side of the insulation boards with the proprietary coating is readily identifiable.

Insulation boards installed in accordance with Sections 3.2 and 3.3 of this report are labeled as follows: The edge of each EPS insulation board is marked with the name and address of Styrotech, Inc., the product name, the name of the inspection agency (Underwriters Laboratories Inc.), and the designation "BASF." Additionally, there is the wording "When used in reroofing applications, limits exist for cover board and membrane. See ICC-ES evaluation report ESR-1025 before reroofing." and the words "THIS SIDE UP".

TABLE 1—MAXIMUM DENSITY AND THICKNESS

CLASSIFICATION	MAXIMUM DENSITY (pcf)	MAXIMUM THICKNESS (inches)	
		System 1	System 2
Type I	1.0	8.0	9.0
Type VIII	1.25	6.4	7.2
Type II	1.50	5.3	6.0
Type IX	2.0	4.0	4.5

For **SI:** 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m^3.